September 11, 1998

MEMORANDUM

TO: Orville D. Green, Assistant Administrator
Air and Hazardous Waste

FROM: Susan J. Richards, Chief
Air Quality Permitting Bureau
Air & Hazardous Waste

SUBJECT: Issuance of Tier II Operating Permits to Bannock Paving Company, Inc.
Portable Hot-Mix Asphalt Plant, Cedarapids #1 (#777-00140)
Portable Rock Crushing Plant, Crusher #1 (#777-00141)

PROJECT DESCRIPTION

Bannock Paving Company, Incorporated, intends to operate its Portable Hot-Mix Asphalt Plant, Cedarapids #1 in conjunction with Portable Rock Crushing Plant, Crusher #1 in both PM-10 attainment and non-attainment areas throughout Idaho. Both facilities are currently permitted to operate separately. A Tier II Operating Permit (OP) has been requested for each facility which will allow for co-located operations while still maintaining minor source status. In addition, Bannock Paving replaced a 400-Kw generator with a 1300-Kw generator at its Crushing plant. The generator replacement has been accounted for in the analysis and permit for the crushing facility.

DISCUSSION

On June 9, 1998, a meeting was held at the Division of Environmental Quality (DEQ) between Bannock Paving Company representatives and DEQ representatives. On July 29, 1998, a proposed Tier II OP was issued for public comment. The public comment period was held from July 29, 1998, through August 28, 1998. No comments were received.

FEES

Fees apply to this facility in accordance with IDAPA 16.01.01.470. The facility is subject to permit application fee for the Tier II permit of five hundred dollars ($500.00).

RECOMMENDATIONS

Based on the review of current PTCs, company provided information, and applicable state and federal rules and regulations, the Bureau recommends that Bannock Paving Company, Inc., be issued a Tier II OP for the Portable Hot-Mix Asphalt Plant, Cedarapids #1, and a Tier II OP for the Portable Rock Crushing Plant, Crusher #1. The facility has been notified in writing of the required Tier II application fees of five hundred dollars ($500.00) each for both facilities. The permit will be issued upon receipt of the fees.

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cc: M. Lowe, Pocatello Regional Office
Source File
COF

September 11, 1998

MEMORANDUM

TO: Susan J. Richards, Chief
Air Quality Permitting Bureau
Air and Hazardous Waste

FROM: Yihong Chen, Air Quality Engineer
Air Quality Permitting Bureau
Operating Permits Section

THROUGH: Daniel Salgado, Air Quality Permits Manager
Air Quality Permitting Bureau
Operating Permits Section

SUBJECT: Technical Analysis for Tier II Operating Permit (#777-00141)
Bannock Paving Company, Inc. (Portable Rock Crushing Plant, Crusher #1)

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

PROJECT DESCRIPTION

Bannock Paving Company, Incorporated, intends to operate their Portable Hot-Mix Asphalt (HMA) Plant, Cedarapids #1; in conjunction with their Portable Rock Crushing Plant, Crusher #1, in both attainment and non-attainment areas throughout the state of Idaho. Both facilities are allowed to operate separately by current PTC #777-00140, dated February 28, 1997, and PTC #777-00141, dated October 4, 1995. The project is to issue a Tier II Operating Permit (OP) for the Portable Hot-Mix Asphalt Plant, Cedarapids #1; and a Tier II OP for the Portable Rock Crushing Plant, Crusher #1; to establish minor source status for their co-located operations. These two Tier II OPs will supersede the current corresponding PTCs. In addition, the change of generator from 400-kW to 1,300-kW has been included in the analysis and this permit.

SUMMARY OF EVENTS

On June 9, 1998, a meeting was held at the Division of Environmental Quality (DEQ) between Bannock Paving Company and DEQ representatives. On June 19, 1998, DEQ sent a follow-up letter to Bannock Paving Company to confirm the Tier II OPs' issuance. During the month of June and July, there were several phone conversations between Bannock Paving Company and DEQ to discuss permit limits and monitoring issues.

On July 29, 1998, a proposed Tier II OP was issued for public comment. The public comment period was held from July 29, 1998, through August 28, 1998. No comments were received.

DISCUSSION

1. Process Description

   The majority of rock crushing facilities in Idaho mine rock deposits from pits using front-end loaders. However, rock may also be mined from quarries by drilling and blasting or dredged from stream beds. Rock crushing facilities generally produce three to four sizes of aggregate by employing a series of crushers and screens.

The rock is transferred to a vibrating grizzly to segregate large from small material. The large material is conveyed to the primary crusher (usually a jaw or gyratory crusher) where it is reduced to three (3) to twelve (12) inches in diameter. The crushed material is transferred to the primary screen where it is separated into two (2) or three (3) size ranges. The oversized material is conveyed to a secondary crusher, and the smaller material is transferred to a tertiary crusher or is stockpiled. The secondary crusher (usually a gyratory or cone crusher) reduces the material to roughly one (1) to four (4) inches in diameter. The material is re-screened. The oversized material is crushed in a tertiary crusher and re-screened, and the small aggregate is stockpiled.

Particulate matter (PM) emissions are generated at all points of crushing, screening and material transfer. The use of water spray is the most common method used to control particulate emissions. If an electrical generation unit is used, the combustion of fuel also results in PM emissions as well as NO_x, SO_x, CO, and VOCs. Fugitive PM emissions are generated by the mining activities, the aggregate storage piles, and front-end loader and truck traffic.

2. Equipment Listing

The analysis upon which this permit is based assumed that the following equipment will be used. However, a throughput of 750 tons per hour (T/hr) for the primary and secondary crushers is used for the analysis. A detailed discussion can be seen in Section 4.3 of this memo.

2.1 Primary Crusher

Manufacturer/Type:	Cedarapids
Date of Manufacture:	1977
Maximum Capacity:	200 T/hr
Date Installed or Last Modified:	1977

2.2 Secondary Crusher

Manufacturer/Type:	E1Jay 66" Standard Cone
Date of Manufacture:	1989
Maximum Capacity:	250 T/hr
Date Installed or Last Modified:	1989

2.3 Tertiary Crusher

Manufacturer/Type:	E1Jay 54" Cone
Date of Manufacture:	1994
Maximum Capacity:	150 T/hr
Date Installed or Last Modified:	1994

2.4 Additional Crusher(s)

Manufacturer/Type:	BarMac 8000 Impactor
Date of Manufacture:	1995
Maximum Capacity:	100 T/hr
Date Installed or Last Modified:	1996

2.5 Generator

Manufacturer:	CAT
Model:	3516
Serial Number:	6AA01747
Rated Power Output(kW):	1,300
Stack Diameter(ft):	0.5
Stack Height(ft):	13.5
Exhaust Flow Rate(ACFM):	6,170
Exhaust Temperature(°F):	1030

3. Area Classification

The rock crushing facility is a portable source and may operate in both attainment and non-attainment areas throughout Idaho.

4. Emission Estimates

4.1 Rock Crushing Plant, Crusher #1 Co-Located with Hot-Mix Asphalt Plant, Cedarapids #1

Allowable emissions and throughput limits of each plant were calculated by Yihong Chen of DEQ using spreadsheets (HMA + Crusher) developed specifically for estimating emissions from Portable HMA Plants and Portable Crushing Plants. The calculation mechanism behind the spreadsheet is the same as that for general permit spreadsheets. The only difference is that this spreadsheet addresses co-located operations of the HMA plant and the Crushing plant. The spreadsheet ensures that the overall facility-wide potential controlled emissions of any criteria air pollutant from the HMA plant and the Crushing plant are below 99 T/Yr. In addition, all applicable National Ambient Air Quality Standards (NAAQS) will be met in attainment areas and there will be no significant contribution to a NAAQS violation in PM-10 and CO non-attainment areas under such co-located operations. The spreadsheet can be seen in Appendix A of this memo, and a control technology analysis performed by Krishna Viswanathan, TSB Air Quality Engineer, can be seen in Appendix B.

Sulfur dioxide (SO_2) is the only pollutant that requires a limit to maintain minor status for co-located operations. SO_2, and all other pollutants, are limited by allowing a maximum asphalt production rate of 936,000 T/Yr for the HMA plant, a maximum crushing throughput rate of 1,662,750 T/Yr for the Rock Crushing Plant, and a maximum operating schedule of 2,217 hr/Yr for the Generator associated with the Rock Crushing Plant.

The above limits inherently ensure that all applicable NAAQS are met in attainment areas.

For non-attainment areas, since currently there are only PM-10 and/or CO non-attainment areas in Idaho, the throughput limits calculated by the spreadsheet (HMA + Crusher) in this permit only ensure no significant contribution to a PM-10 or a CO NAAQS violation. PM-10 was determined to be the most limiting pollutant. The resultant limits are a maximum allowable asphalt production of 3,195 T/day for the HMA plant, and a maximum allowable operating schedule of fifteen (15) hr/day for the Generator associated with the Rock Crushing Plant.

4.2 Rock Crushing Plant, Crusher #1 - located Alone

The facility will comply with the same annual limits as that in the above section (Section 4.1). These limits ensure that the facility will be a minor source and will meet all applicable NAAQS in attainment areas.

For non-attainment areas, the current Department general permit spreadsheet for Crushing Plant was used. It can be seen in Appendix A of this memo. There are no daily throughput and daily operating hour limits when the Rock Crushing plant is operated alone in non-attainment areas.

4.3 Emission Estimating from Crushers

750 tons per hour (T/hr) of aggregate is run through a set of screens prior to entering the primary crusher (Jaw Crusher). After screening, about 200 tons per hour (T/hr) of material enters the primary crusher, and small size material is fed to the secondary crusher (Cone Crusher). The crushing throughput for each crusher varies. In the general permit spreadsheet, a 750 tons per hour (T/hr) throughput has been assumed to enter the primary and secondary crushers, and seventy-five percent (75%) of the initial throughput (562.5 T/hr) enters the third and forth crusher. As a result, the analysis is very conservative.

5. Modeling

Modeling of the asphalt dryer stack emissions was conducted using the EPA approved SCREEN3 computer model. The maximum one (1) hour impact from the dryer stack was calculated to be 3.25 $\mu g/m^3$ using a one (1) lb/hr emission rate input to the model. The modeling results can be seen in Appendix C of this memo.

Modeling of emissions from the Rock Crusher generator stack was conducted using the EPA approved SCREEN3 computer model. The maximum one (1) hour impact from the dryer stack was calculated to be 13.13 $\mu g/m^3$ using a one (1) lb/hr emission rate input to the model. The modeling results can be seen in Appendix C of this memo.

The NAAQS for PM-10 is 150 $\mu g/m^3$, twenty-four (24) hour average period; and fifty (50) $\mu g/m^3$, annual arithmetic mean. For CO, it is 10,000 $\mu g/m^3$, eight (8) hour average period; and 40,000 $\mu g/m^3$, one (1) hour average period. For NO_x, it is 100 $\mu g/m^3$, annual arithmetic mean. For SO_2, it is 1,300, three (3) hour average period; 365 $\mu g/m^3$, twenty-four (24) hour average period; and eight (80) $\mu g/m^3$, annual arithmetic mean.

The background concentration of the pollutants are taken from the current HMA general permit spreadsheet. For PM-10, it is eighty-six (86) $\mu g/m^3$, twenty-four (24) hour average period; and 32.7 $\mu g/m^3$, annual arithmetic mean. For CO, it is 5,130 $\mu g/m^3$, eight (8) hour average period; and 11,400 $\mu g/m^3$, one (1) hour average period. For NO_x, it is forty (40) $\mu g/m^3$, annual arithmetic mean. For SO_2, it is 543 $\mu g/m^3$, three (3) hour average period; 144 $\mu g/m^3$, twenty-four (24) hour average period; and 23.5 $\mu g/m^3$, annual arithmetic mean.

The allowable impact concentration is calculated as NAAQS minus background concentration. For PM-10, it is sixty-four (64) $\mu g/m^3$, twenty-four (24) hour average period; and 17.3 $\mu g/m^3$, annual arithmetic mean. For CO, it is 4,870 $\mu g/m^3$, eight (8) hour average period; and 28,600 $\mu g/m^3$, one (1) hour average period. For NO_x, it is sixty (60) $\mu g/m^3$, annual arithmetic mean. For SO_2, it is 757 $\mu g/m^3$, three (3) hour average period; 221 $\mu g/m^3$, twenty-four (24) hour average period; and 56.5 $\mu g/m^3$, annual arithmetic mean.

For PM-10 and CO non-attainment areas, under IDAPA 16.01.01.006.89, the significant contribution for PM-10 is five (5) $\mu g/m^3$, twenty-four (24) hour average period; and 1.0 $\mu g/m^3$, annual arithmetic mean. For CO, it is 500 $\mu g/m^3$, eight (8) hour average period; and 2,000 $\mu g/m^3$, one (1) hour average period.

The factors to convert the impact from a one (1) hour average period to an eight (8) hour, twenty-four (24) hour, and annual average period are 0.7, 0.4 and 0.08, respectively.

5.1 Rock Crushing Plant, Crusher #1 Co-Located with Hot-Mix Asphalt Plant, Cedarapids #1

The HMA + Crusher spreadsheet calculates the ambient impact for each air pollutant (PM-10, NO_x, SO_2 and CO) based on the calculated lb/hr emission rate, averaging periods and background concentrations. By trial and error, and using the spreadsheet, a set of operating limits must be chosen that meet the following criteria: 1) facility-wide potential controlled emissions of each criteria air pollutant from the HMA plant and the Crushing plant are below 99 T/Yr; 2) all applicable NAAQS are met in attainment areas; and 3) no significant contribution to PM-10 and CO NAAQS violation. By discussing with the company and giving the maximum flexibility for the co-located operations, the optimum limit combination has been chosen.

In attainment areas, for example, the twenty-four (24) hour impact of PM-10, under permitted limits, from the dryer and the generator is 12.5 $\mu g/m^3$, which is calculated by the following method: 3.25 $\mu g/m^3$/(1 lb/hr) x 6.7 lb/hr x 0.4 + 13.13 $\mu g/m^3$/(1 lb/hr) x 0.7 lb/hr x 0.4. The annual impact of PM-10 from the dryer and the generator is 0.6 $\mu g/m^3$, which is calculated by the following method: 3.25 $\mu g/m^3$/(1 lb/hr) x 6.7 lb/hr x 0.08 x 2080 hr /8760 hr + 13.13 $\mu g/m^3$/(1 lb/hr) x 0.7 lb/hr x 0.08 x 2217 hr/8760 hr. To compare the source impact of PM-10 with its corresponding allowable impact, it can be seen that all PM-10 NAAQS are met. The same methodology is used for other pollutants.

In non-attainment areas, the twenty-four (24) hour impact of PM-10, under permitted limits, from the dryer and the generator is 5 $\mu g/m^3$, which is calculated by the following method: 3.25 $\mu g/m^3$/(1 lb/hr) x 6.7 lb/hr x 7.1/24 x 0.4 + 13.13 $\mu g/m^3$/(1 lb/hr) x 0.7 lb/hr x 15/24 x 0.4. The annual impact is the same as aforementioned. The same methodology is used for CO. To compare the source impact of PM-10 and CO with the corresponding significant contribution levels, it can be seen that PM-10 is the limiting pollutant.

5.2 Rock Crushing Plant, Crusher #1 - Located Alone

The general permit Crusher spreadsheet calculates the ambient impact for each air pollutant (PM-10, NO_x, SO_2 and CO) based on the calculated lb/hr emission rate, averaging periods and background concentrations. The spreadsheet solves for the most limiting pollutant in attainment areas and gives appropriate operational limits which protect the applicable NAAQS as defined in IDAPA 16.01.01.577. In addition, the spreadsheet also calculates the most limiting pollutant in non-attainment areas and gives operational limits to protect applicable significant contribution requirements as defined in IDAPA 16.01.01.006.89.

6. Facility Classification

Rock crushing plants are not designated facilities, as defined in IDAPA 16.01.01.006.25. This facility is not a major facility as defined in IDAPA 16.01.01.006.54 and IDAPA 16.01.01.008.14. The SIC code for this facility is 1442, "Construction Sand and Gravel". The facility classification is A2. The following equipment used at this facility is subject to the New Source Performance Standards (Title 40 Code of Federal Regulations Part 60, Subpart OOO, "Standards of Performance for Nonmetallic Mineral Processing Plants"):

Secondary Crusher	E1Jay 66" Standard Cone;
Tertiary Crusher	E1Jay 54" Cone;
Additional Crusher	BarMac 8000 Impactor.

7. Regulatory Review

The following rules and/or regulations have been reviewed in this permit analysis:

a.	IDAPA 16.01.01.123	Certification of documents
b.	IDAPA 16.01.01.135	Excess Emissions Reports
c.	IDAPA 16.01.01.401	Tier II Operating Permit.
d.	IDAPA 16.01.01.403	Permit Requirements for Tier II Sources.
e.	IDAPA 16.01.01.404.01.c	Opportunity for Public Comment.
f.	IDAPA 16.01.01.404.04	Authority to Revise Operating Permits.
g.	IDAPA 16.01.01.406	Obligation to Comply.
h.	IDAPA 16.01.01.470	Permit Application Fees for Tier II Permits.
i.	IDAPA 16.01.01.500	Registration Procedures and Requirements for Portable equipment.
j.	IDAPA 16.01.01.625	Visible Emission Limitation.
k.	IDAPA 16.01.01.650	General Rules for the Control of fugitive dust.
l	IDAPA 16.01.01.728	Distillate Fuel Oil
m.	40 CFR 60, Subpart OOO	Standards of Performance for Nonmetallic Mineral Processing plants.

FEES

Fees apply to this facility in accordance with IDAPA 16.01.01.470. The facility is subject to permit application fee for the Tier II permit of five hundred dollars ($500.00).

AIRS

The AIRS database for Bannock Paving's Rock Crushing Plant, Crusher #1 (#777-00141) will be updated to include the new Crushing plant limitations as a result of the final operating permit.

RECOMMENDATIONS

Based on the review of its current PTC, information provided by the company, and all applicable state and federal rules and regulations concerning the permitting of air pollution sources, the Bureau recommends that Bannock Paving Company, Inc., be issued a Tier II OP for the Portable Rock Crushing Plant, Crusher #1. The facility has been notified in writing of the required Tier II application fee of five hundred dollars ($500.00). The permit will be issued upon receipt of the fee.

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cc: M. Lowe, Pocatello Regional Office
Source File
COF

APPENDIX A

BAPCO HMA No.1 and Crusher No.1 Emissions and Ambient Impact Calculations

Bannock Paving Company, Inc.		Date	07/08/98
Filename	a1c1ana2.wk4	Engineer	Yihong Chen

A1 in conjunction with C1 in attainment and non-attainment areas

Asphalt Plant Cedarapids #1			
Dryer	Operating hour	2,080	hr/Yr
	Production rate	936,000	T/Yr
	Additional operating conditions for non-attainment area:		
	Daily operating hour	7.1	hr/day
	Daily production rate	3,195	T/day
	Model	3.25	ug/m^3@ 1 lb/hr, 1 hr from SCREEN3
Portable Rock Crushing Plant #1			
Crusher	Operating hour	2,217	hr/Yr
	Throughput	1,662,750	T/yr
Generator	Operating hour	2,217	hr/Yr
	Additional operating conditions for non-attainment area:		
	Daily operating hour	15	hr/day
	Model	13.13	ug/m^3@ 1 lb/hr, 1 hr from SCREEN3

Emissions	Dryer		Generator		Fugitive from HMA	Fugitive crush, screen...	Total
Pollutant	T/Yr	lb/hr	T/Yr	lb/hr	T/Yr	T/Yr	T/Yr
PM	6.9	6.7	1.0	0.9	7.0	120.2	135.2
PM-10	6.9	6.7	0.8	0.7	2.6	46.0	56.4
CO	16.9	16.2	11.6	10.5			28.5
NOx	35.1	33.7	44.4	40.0			79.5
SO2	91.8	88.2	7.2	6.5			99.0

Attainment Area

Allowable Impact = NAAQs standards - background concentration

	1-hr	3-hr	8-hr	24-hr	Annual
PM-10				64	17.3
CO	26600		4870		
NOx					60
SO2		757		221	56.5

Impact from Sources

	NAAQs impact @1 hr	NAAQs impact @ 3 hr 1hr con*.9	NAAQs impact @ 3 hr 1hr con*.7	NAAQs impact @ 24 hr 1hr con*.4	NAAQs impact @annual 1 hr con*0.08
PM-10				12.5	0.6
CO	190.3		133.2		
NOx					12.7
SO2		335.0		148.9	7.2

Left Margin = Allowable Impact - Impact from Source

	NAAQs impact @1 hr	NAAQs impact @ 3 hr	NAAQs impact @ 3 hr	NAAQs impact @ 24 hr	NAAQs impact @annual
PM-10				51	17
CO	28410		4737		
NOx					47
SO2		422		72	49

Non-attainment Area

Significant Contribution (IDAPA 16.01.01.006.89, 5-1-94)

	1-hr	3-hr	8-hr	24-hr	Annual
PM-10				5	1.0
CO	2000		500		
NOx					1.0
SO2		25		5	1.0

Impact from Sources

	NAAQs impact @1 hr	NAAQs impact @ 3 hr 1hr con*.9	NAAQs impact @ 3 hr 1hr con*.7	NAAQs impact @ 24 hr 1hr con*.4	NAAQs impact @annual 1hr con*0.08
PM-10				5.0	0.6
CO	190.3		133.2		
NOx					12.7
SO2		335.0		55.3	7.2

Left Margin =Significant Contribution - Impact from Source

	NAAQs impact @1 hr	NAAQs impact @ 3 hr	NAAQs impact @ 3 hr	NAAQs impact @ 24 hr	NAAQs impact @annual
PM-10				0.0	0.4
CO	1810		367		
NOx					-12
SO2		-310		-50	-6

Note:

Annual production = rated hourly production rate (a constant) x operating hours->

Emissions (T/Yr) are proportion to annual production ->

Therefor, emissions (T/Yr) are proportion to operating hours ->

a) Emissions (E,general) @ certain operating hours (t, general) were taken from general permit spreadsheet
Emissions (E) for this spreadsheet are calculated as: E= E,general /t, general * t

b) NAAQS impact (24 hr) = Dryer's ug/m^3 * daily operating hours/24 hr + Generator's ug/m^3 *daily operating hours/24

c) NAAQS impact (annual) = Dryer's ug/m^3 * annual operating hours/8760 + Generator's ug/m^3 *annual operating hours/8760

DATA ENTRY

Company Name:	Bannock Paving Company, Inc.	Engineer:	Yihong Chen
Project:	Portable Crusher	Date:	08-Jul-98
PTC #:		Filename:	C1sep02.wk1

Crusher Facility Information

Facility Production Capacity:	750 [=] tons/hr	
Applicant's		
Requested Hours of Operation:	24 [=] hrs/day	
	8,760 [=] hrs/yr	
Estimated Throughput:	6,525,000 [=] tons/yr	
Maximum Hours of Operation:	8,760 [=] hrs/yr	
Maximum Throughput:	6,570,000 [=] tons/yr	
Number of Crushers:	4	

Limitations

Annual Threshold Emission Limit:	A	(A = <100 Tons/yr; Below Title V Threshold)
		(B = <250 Tons/yr; PSD Threshold)
Selected Emission Limitation:	100 Tons/yr	

Generator Information

Generator? (Y/N)	Y	
Generator Size:	1,300 [=] kW	1742.91 Conversion Factor
Units:	B	(A = Horsepower)
		(B = Kilowatts)
Fuel Type:	A	(A = Diesel-Fired Generator)
		(B = Gasoline-Fired/Dual-Fired Generator)
Fuel Usage:	94.9 gal/hr	
Fuel Heating Value:	12.9125685 [=] MMBtu/hr	
Modeled 1-hr Concentration:	13.13 [=] µg/m3 at emission rate of 1 lb/hr	

Dust Point Emission Factors

Mean Wind Speed (U)	10 [=] mph
Material Moisture Content (M)	2.5 [=] %
Particle Size Multiplier (k)	
PM-10 (<10 µm)	0.35 [=] dimensionless
PM (<30 µm)	0.74 [=] dimensionless
Emission Factor:	
PM-10 (<10 µm)	0.0020 [=] lb/ton
PM:	0.0043 [=] lb/ton
	0.0067 [=] lb/ton

Notes: 1 PM = (k*0.0032*(U/5)^1.3/(M/2)^1.4)/0.8

Background Concentrations -- Attainment/Non-Classifiable Areas (ug/m3)					
	1-hr	3-hr	8-hr	24-hr	Annual
PM					
PM-10				86.0	32.7
CO	11,400		5,130		
NO_x					40.0
SO_2		543		144	23.5
TOC					

OUTPUT

Potential to Emit -- Based on Applicant's Data

Crusher, Screens & Transfer Points	Uncontrolled Emissions	Controlled Emissions
PM	1,570 tons/yr	471 tons/yr
PM-10	597 tons/yr	179 tons/yr
Generator		
PM	3.9 tons/yr	3.9 tons/yr
PM-10	3.2 tons/yr	3.2 tons/yr
CO	45.5 tons/yr	45.5 tons/yr
NO_x	174.1 tons/yr	174.1 tons/yr
SO_2	28.4 tons/yr	28.4 tons/yr
TOC	5.6 tons/yr	5.6 tons/yr
Total Crusher + Generator		
PM	1574 tons/yr	475 tons/yr
PM-10	600 tons/yr	182 tons/yr
PTE Summary	1573.7 [=] T/yr of PM	474.8 [=] T/yr of PM

Enforceable Limits -- Based on Requested Operations				
Generator -- Operation	24.0	hrs/day	8,700	hr/yr
Crusher -- Production	18,000	T/day	6.53	MMT/yr
DEQ Classification:	A1			

Potential to Emit -- Emissions Analysis Using Ambient Air Quality Standards

Emissions limited to less than: 100 Tons/yr

Assumptions: Plant operations limited by NAAQS from generator emissions, and, Crusher emissions back-calculated to yield 99 Tons/yr of emissions.

Attainment/Non-Classifiable Area				Non-Attainment Area			
Uncontrolled Emissions		Controlled Emissions		Crusher	Uncontrolled Emissions		Controlled Emissions
323 tons/yr		97 tons/yr		PM	323 tons/yr		97 tons/yr
123 tons/yr		37 tons/yr		PM-10	123 tons/yr		37 tons/yr
				Generator			
2.2 tons/yr		2.2 tons/yr		PM	2.2 tons/yr		2.2 tons/yr
1.8 tons/yr		1.8 tons/yr		PM-10	1.8 tons/yr		1.8 tons/yr
25.9 tons/yr		25.9 tons/yr		CO	25.9 tons/yr		25.9 tons/yr
99.0 tons/yr		99.0 tons/yr		NO_x	99.0 tons/yr		99.0 tons/yr
16.1 tons/yr		16.1 tons/yr		SO_2	16.1 tons/yr		16.1 tons/yr
3.2 tons/yr		3.2 tons/yr		TOC	3.2 tons/yr		3.2 tons/yr
				Totals:			
325 tons/yr		99 tons/yr		PM	325 tons/yr		99 tons/yr
125 tons/yr		39 tons/yr		PM-10	125 tons/yr		39 tons/yr
324.8 [=] T/yr of PM		99.0 [=] T/yr of PM		PTE Summary	324.8 [=] T/yr of PM		99.0 [=] T/yr of PM
Enforceable Limits -- Attainment Areas					Enforceable Limits -- Non-Attainment Areas		
24.0	hrs/day	4,944	hr/yr	Generator	24.0	hrs/day	4,944 hr/yr
18,000	T/day	1.34	MMT/yr	Crusher	18,000	T/day	1.34 MMT/yr
DEQ Classification:	A2				DEQ Classification:	A2	

EMISSION ANALYSIS BASED ON APPLICANT'S DATA

Generator Emissions			Applicant's Data		Generator Emissions		Modeled Air Concentrations Based On Entered SCREEN3 Data		
Pollutant	Generator Emission Factor [=] lb/MMBtu	Generator Emission Rate [=] lb/hr	Hours of Operation [=] hr/day	[=] hr/year	Hours of Operation lbs/day	T/yr	Calculated 24-hr Impact [=] ug/m3	Calculated Annual Impact [=] ug/m3	Calculated Annual Impact [=] Other
PM	0.0497	0.90	24.0	8,700	21.60	3.92	N/A	N/A	
PM-10	0.0373	0.74	24.0	8,700	17.76	3.22	3.9	0.8	
CO	0.8100	19.44	24.0	8,700	251.02	45.50	54.9	10.9	137.2 96.3
NOx	3.1000	40.03	24.0	8,700	960.70	174.13		41.8	
SOx	0.5650	6.52	24.0	8,700	156.50	28.37	34.2	6.8	77.4
TOC	0.1000	1.29	24.0	8,700	30.99	5.62			

Generator Emissions	Generator Emissions Regulatory Analysis						Ambient Air Concentrations w/ Background Values (ug/m3)				
	BRC Evaluation		Significant Contribution Emission Rates		Non-Attainment Area Significant Contribution Ambient Air Concentration						
Pollutant					24-hr	Annual	1-hr	3-hr	8-hr	24-hr	Annual
PM	Above BRC	(2.5 T/yr)	No	(25 T/yr)						89.9	33.5
PM-10	Above BRC	(1.2 T/yr)	No	(15 T/yr)	No	5 ug/m3	1 ug/m3				
CO	Above BRC	(10 T/yr)	No	(100 T/yr)	No	2000 ug/m3 (1-hour)	500 ug/m3 (8-hour)	11,537		5,226	
NOx	Above BRC	(4 T/yr)	Significant	(40 T/yr)							81.8
SOx	Above BRC	(4 T/yr)	No	(40 T/yr)					620		178.2	30.3
TOC											

Rock Crusher Emissions	Crushers		Screens		Transfer Points		Total Emissions
	Nos. 1 & 2	Nos. 3 - 4	Nos. 1 & 3	Nos. 3 - 4	Nos. 3 - 14	Nos. 15 - 28	
No. Units	2	2	2	2	14	14	
Throughput ([=] T/hr/Unit)	750	563	750	563	750	375	
Operation Schedule ([=] hrs/day)	24						
Throughput ([=] Mil T/yr/Unit)	6.53	4.89	6.53	4.89	6.53	3.26	
Operation Schedule ([=] hrs/yr)	8,700						
Control Efficiency	70%	70%	70%	70%	70%	70%	
PM-10							
Emission Factor)	0.0003	0.0024	0.0150	0.0710	0.0028	0.0020	
Uncontrolled Emissions ([=] lb/hr)	0.40	2.70	22.50	79.88	31.19	10.59	137.3
Controlled Emissions ([=] lb/hr)	0.12	0.81	6.75	23.96	6.36	3.18	41.2
Uncontrolled Emissions ([=] T/yr)	1.7	11.7	97.9	347.3	92.2	46.1	597.1
Controlled Emissions ([=] T/yr)	0.5	3.5	29.4	104.2	27.6	13.8	179.1
PM							
Emission Factor)	0.0007	0.0063	0.0394	0.1864	0.0053	0.0053	
Uncontrolled Emissions ([=] lb/hr)	1.05	7.09	59.06	209.67	55.99	28.00	360.9
Controlled Emissions ([=] lb/hr)	0.32	2.13	17.72	62.90	16.80	8.40	108.3
Uncontrolled Emissions ([=] T/yr)	4.6	30.8	256.9	912.1	243.6	121.8	1569.8
Controlled Emissions ([=] T/yr)	1.4	9.2	77.1	273.6	73.1	36.5	470.9

For information purposes:

Crusher Hours of Operation to Yield 99.0 T/yr Emissions	
w/o Generator	w/ Generator
	8700
	hrs/yr
4809	4432
1829	1757

Notes:
1 Number of Screens = Number of Crushers
2 Number of Transfer Points = 7*(Number of Crushers)
3 Emission Factors from AP-42, Table 11.19.2-2. Where factors were given for one pollutant, the following conversion factors were used:
TSP = PM10*2.1; TSP = PM*0.8
Hourly values are based on maximum daily production rates given above. Annual values are based on throughput values given above.

	Generator Emissions		Crusher Emissions (Controlled)		Total Emissions	
Pollutant	lb/day	T/yr	lb/day	T/yr	lb/day	T/yr
PM	21.60	3.92	2598.2	470.9	2619.8	474.8
PM-10	17.76	3.22	988.2	179.1	1006.0	182.3
CO	251.02	45.50			251.0	45.5
NOx	960.70	174.13			960.7	174.1
SOx	156.50	28.37			156.5	28.4
TOC	30.99	5.62			31.0	5.6

Enforceable Limits				
Generator -- Operation	24.0	hrs/day	8,700	hr/yr
Crusher -- Production	18,000	T/hr	6.53	Mil T/yr

EMISSION ANALYSIS -- BASED ON AMBIENT AIR QUALITY STANDARDS

Emissions limited to less than: 100 Tons/yr

Attainment Area

Pollutant	Generator Emission Factor (=) lb/MMBtu	Generator Emission Rate (=) lb/hr	Calculated Impacts: AAQS Hours of Operation (=) hr/day	AAQS Hours of Operation (=) hr/year	Calculated Impacts: Hours of Operation (=) Other	< 100 TPY: Hours of Operation (=) hr/year	Allowable Impacts: Generator Hours of Operation (=) hr/day	Generator Hours of Operation (=) hr/year	Crusher Hours of Operation (=) hr/year	< 100 TPY: Calculated Emissions (=) tons/year	Maximum Throughput (=) MM Tons/year
PM	0.0697	0.90	N/S	N/S		8,760	24.0	4,946	1,788	99.00	1.34
PM-10	0.0573	0.74	24.0	8,760		8,760				38.64	3.54
CO	0.8100	10.46	N/S	N/S	1.0 2 8.0 3	8,760				25.87	
NOx	3.1000	40.03	N/S	8,760		4,946				99.00	
SO2	0.5050	6.52	24.0	8,760	3.0 4	8,760				16.13	
TOC	0.1000	1.29	N/S	N/S		8,760				3.19	

Pollutant	Generator Emissions: Calculated 24-hr Impact (=) ug/m3	Calculated Annual Impact (=) ug/m3	Calculated Impact (=) Other	Ambient Air Concentrations w/ Background Value (ug/m3) Based On Entered SCREEN3 Data: 1-hr	3-hr	8-hr	24-hr	Annual
PM	N/S	N/S						
PM-10	3.9	0.4						
CO	54.9	6.2	137 3 96 2	11,537		5,226		
NOx	210.2	23.7						64
SO2	34.2	3.9	77 4		620		178	37.4
TOC	6.8	0.8						

	Crushers: Nos. 1 & 2	Crushers: Nos. 3 - 4	Screens: Nos. 1 & 2	Screens: Nos. 3 - 4	Transfer Points: Nos. 1 - 14	Transfer Points: Nos. 15 - 28	Total Emissions	Allowable Hours of Operation w/ Emissions <100 T/yr: w/o Generator	w/ Generator
No. Units	2	2	2	2	14	14			
Throughput (=) T/hr/unit)	750	563	750	563	750	375			
Throughput (=) MM T/yr/unit)	1.34	1.01	1.34	1.01	1.34	0.67			
Operation Schedule (=) hrs/yr)	1,788								
Control Efficiency	70%	70%	70%	70%	70%	70%			
PM-10									
Emission Factor)	0.0003	0.0024	0.0150	0.0710	0.0020	0.0020			
Uncontrolled Emissions (=) lb/hr)	0.40	2.70	22.50	79.88	21.19	10.59	137.3		
Controlled Emissions (=) lb/hr)	0.12	0.81	6.75	23.96	6.36	3.18	41.2	4809	4730
Uncontrolled Emissions (=) T/yr)	0.4	2.4	20.1	71.4	18.9	9.5	122.7		
Controlled Emissions (=) T/yr)	0.1	0.7	6.0	21.4	5.7	2.8	36.8		
PM									
Emission Factor)	0.0007	0.0063	0.0394	0.1864	0.0053	0.0053			
Uncontrolled Emissions (=) lb/hr)	1.05	7.09	59.06	209.67	55.99	28.00	360.9		
Controlled Emissions (=) lb/hr)	0.32	2.13	17.72	62.90	16.80	8.40	108.3	1829	1788
Uncontrolled Emissions (=) T/yr)	0.9	6.3	52.8	187.4	50.1	25.0	322.6		
Controlled Emissions (=) T/yr)	0.3	1.9	15.8	56.2	15.0	7.5	96.8		

Notes:

1 TPY calculations include crusher, screen and transfer point emissions.

2 CO 1-hr Averaging Period

3 CO 8-hr Averaging Period

4 SO2 3-hr Averaging Period

-- Daily and annual operation values are based on background data less the modeled generator emissions (i.e., ambient air concentrations). That is, the generator hours of operation have been back-calculated from AAQS values. The crusher particulate emissions (controlled) are then used to back-calculate crusher operational times, assuming 99 Tons/yr less generator emissions.

-- Maximum throughput values are based on the minimum number of hours (crusher) that will yield a total of 99 Tons/yr, multiplied by the maximum daily production rates.

-- Hourly emission values are based on maximum daily production rates, given above.

-- Annual emission values are based on the maximum throughput values given above.

EMISSION ANALYSIS -- BASED ON AMBIENT AIR QUALITY STANDARDS

Emissions limited to less than: 100 Tons/yr

Non-Attainment Area

Pollutant	Generator Emission Factor [=] lb/ton-hr	Generator Emission Rate [=] lb/hr	Calculated Impacts: AAQS: Hours of Operation [=] hr/day	AAQS: Hours of Operation [=] hr/year	Hours of Operation [=] Other	< 100 TPY: Hours of Operation [=] hr/year	Allowable Impacts: Generator Hours of Operation [=] hr/day	Generator Hours of Operation [=] hr/year	Crusher Hours of Operation [=] hr/year	< 100 TPY: Calculated Emissions [=] tons/year	Maximum Throughput [=] MMT/year
PM	0.0697	0.90	N/S	N/S		8,760	24.0	4,946	1,788	99.00	1.34
PM-10	0.0573	0.74	24.0	8,760		8,760				58.64	3.54
CO	0.8100	10.46	N/S	N/S	1.0 [2] 8.0 [3]	8,760				25.87	
NOx	3.1000	40.03	N/S	8,760		4,946				99.00	
SO2	0.5050	6.52	24.0	8,760	3.0 [4]	8,760				14.13	
TOC	0.1000	1.29	N/S	N/S		8,760				3.19	

Pollutant	Generator Emissions: Based On Entered SCREEN Data: Calculated 24-hr Impact [=] ug/m3	Calculated Annual Impact [=] ug/m3	Calculated Impact [=] Other	Ambient Air Concentrations w/ Background Values (ug/m3): 1-hr	3-hr	8-hr	24-hr	Annual
PM	N/S	N/S						
PM-10	3.9	0.4						
CO	34.9	6.2	137 [2] 96 [3]	11,537		5,226		
NOx	210.2	23.7						64
SO2	34.2	3.9	77.4		420		178	27.4
TOC	6.8	0.8						

	Crushers: Nos. 1 & 2	Crushers: Nos. 3 - 4	Screens: Nos. 1 & 2	Screens: Nos. 3 - 4	Transfer Points: Nos. 1 - 14	Transfer Points: Nos. 15 - 28	Total Emissions	Allowable Hours of Operation w/ Emissions <100 T/yr: w/o Generator	Allowable Hours of Operation w/ Emissions <100 T/yr: w Generator
No. Units	2	2	2	2	14	14			
Throughput ([=] T/hr/unit)	750	563	750	563	750	375			
Throughput ([=] MM T/yr/unit)	1.34	1.01	1.34	1.01	1.34	0.67			
Operation Schedule ([=]hrs/yr)	1,788								
Control Efficiency	70%	70%	70%	70%	70%	70%			
PM-10									
Emission Factors	0.0003	0.0024	0.0150	0.0710	0.0020	0.0020			
Uncontrolled Emissions ([=] lb/hr)	0.40	2.70	22.50	79.88	21.19	10.59	137.3		
Controlled Emissions ([=] lb/hr)	0.12	0.81	6.75	23.96	6.36	3.18	41.2	8259	4720
Uncontrolled Emissions ([=] T/yr)	0.4	2.4	20.1	71.4	18.9	9.5	122.7		
Controlled Emissions ([=] T/yr)	0.1	0.7	6.0	21.4	5.7	2.8	36.8		
PM									
Emission Factors	0.0007	0.0063	0.0394	0.1864	0.0053	0.0053			
Uncontrolled Emissions ([=] lb/hr)	1.05	7.09	59.06	209.67	55.99	28.00	360.9		
Controlled Emissions ([=] lb/hr)	0.32	2.13	17.72	62.90	16.80	8.40	108.3	1829	1788
Uncontrolled Emissions ([=] T/yr)	0.9	6.3	53.8	187.4	50.1	25.0	322.6		
Controlled Emissions ([=] T/yr)	0.3	1.9	15.8	56.2	15.0	7.5	96.8		

Notes:

1 TPY calculations include crusher, screen and transfer point emissions.

2 CO 1-hr Averaging Period

3 CO 8-hr Averaging Period

4 SO2 3-hr Averaging Period

– *Daily and annual operation values are based on background data less the modeled generator emissions (i.e., ambient air concentrations). That is, the generator hours of operation have been back-calculated from AAQS values. The crusher particulate emissions (controlled) are then used to back-calculate crusher operational times, assuming 99 Tons/yr less generator emissions.*

– *Maximum throughput values are based on the minimum number of hours (crusher) that will yield a total of 99 Tons/yr, multiplied by the maximum daily production rates.*

– *Hourly emission values are based on maximum daily production rates, given above.*

– *Annual emission values are based on the maximum throughput values given above.*

– *Non-Attainment Area hour of operation calculations assume TSP emissions are non-attainment in PM-10 non-attainment areas. Therefore, operation is limited by significant impact limits.*

INPUT SECTION - enter info in highlighted areas only

Company:	Bannock Paving Company, Inc.	
Permit Engineer:	Yihong Chen	
Date:	06/26/98	
Filename:	A1sep.wk1	
HMA Plant Type:	B	(A = Batch Mix Hot Mix Asphalt Plant) (B = Drum Mix Hot Mix Asphalt Plant)
Dryer Fuel Type:	C	(A = Natural Gas-Fired Dryer) (B = Distillate Fuel Oil-Fired Dryer) (C = Residual Fuel Oil-Fired Dryer) (D = Waste Oil-Fired Dryer)
Dryer Stack Flow Rate:	33,395	[=] actual cubic feet per minute (acfm)
Dryer Stack Temperature:	261	[=] temperature (oF)
Dryer Stack Moisture Content:	20.00	[=] moisture wt % (Default 18 wt%)
Dryer Stack Pressure:	29.92	[=] stack pressure (Default 29.92 "Hg)
Corrected Flow Rate (calculated):	19,561	[=] dry standard cubic feet per minute (dscfm)
Facility Production Capacity:	450	[=] Ton/hr
Modeled 1-hr Concentration:	3.25	[=] µg/m3, at a unity emission rate of 1 lb/hr
Is a PM performance test required for this HMA plant?	N	(Y or N)
Generator? (Y/N)	N	(Y or N)

SPREADSHEET DATA - information used by spreadsheet

Background Concentrations

	1-hr	3-hr	8-hr	24-hr	Annual
PM-10				86	32.7
CO	11400		5130		
NOx					40
SOx		543		144	23.5

Fugitive Emission Data

Mean Wind Speed (U)	10	[=] mph
Material Moisture Content (M)	2.5	[=] %
Particle Size Multiplier (k)		
PM-10 (<10 µm)	0.35	[=] dimensionless
Emission Factor:		
PM-10 (<10 µm)	0.0020	[=] lb/T
PM2	0.0053	[=] lb/T

Notes: : EF = k*0.0032*(U/5)^1.3/(M/2)^1.4
Drop-Point Equation, Rating "A." AP-42, 5th Ed. p.13.2.4-3.
Assumptions: Wind Speed = 10 mph; Moisture = 2.5%; and Aggregate = 94% of product.

FACILITY CLASSIFICATION INPUT

Facility Annual Emission Limit: 100 [=]T/yr
Note: Use 100 T/yr for Title V Limitation
Use 250 T/yr for PSD Limitation
For the standard HMA permit, use 100 T/yr.

DRYER EMISSION RATE CALCULATIONS

	DRYER STACK		
Pollutant	Emission Factor [=] lb/ton	Emission Rate (Uncontrolled) [=] lb/hr	Emission Rate (Controlled) [=] lb/hr
Total PM	19.00	8,550.00	6.71
	[=] gr/dscf		
Total PM-10	0.04	1,935.00	6.71
	[=] lb/ton		
CO	0.04	16.20	16.20
NOx	0.08	33.75	33.75
SO2	0.20	88.20	88.20

HMA emission factors for CO, NOx, SO2 and uncontrolled PM & PM-10 are from AP-42 Section 11.1. Controlled PM & PM-10 is from the NSPS 0.04 gr/dscf.

GENERATOR EMISSION RATE CALCULATIONS

	GENERATOR STACK		
Pollutant	Emission Factor [=] lb/hp-hr	Emission Rate (Uncontrolled) [=] lb/hr	Emission Rate (Controlled) [=] lb/hr
Total PM	N/A	0.00	0.00
Total PM-10	N/A	0.00	0.00
CO	N/A	0.00	0.00
NOx	N/A	0.00	0.00
SO2	N/A	0.00	0.00

Generator emission factors are from AP-42 Section 3.3 and 3.4.

PERMIT REQUIREMENTS SECTION - enforceable permit limits

Facility Classification: A2

Permit Emission Rate Limits			
		Allowable Emission Limits	
HMA Dryer Stack:	**NA**	**lb/hr**	**99.0 T/yr of SO_2**
Permit Limits for Attainment and Unclassifiable Area Operations			
HMA Plant Throughput Limits:	**NA**	**T/day**	**1,010,204 T/yr**
Permit Limits for Nonattainment Area Operations			
HMA Plant Throughput Limits:	**6,194**	**T/day**	

MODELING ANALYSIS CALCULATIONS FOR ATTAINMENT AREAS

	Allowable Impacts						Permitted Impacts			
	NAAQS			< 100 TPY			NAAQS			< 100 TPY
Pollutant	Hours of Operation [=] hr/day	Hours of Operation [=] hr/year	Other a,b,c	Hours of Operation [=] hr/year	Hours of Operation [=] hr/day	Hours of Operation [=] hr/year	Calculated 24-hr Impact [=] µg/m3	Calculated Annual Impact [=] µg/m3	Other a,b,c	Calculated Emissions [=] ton/year
PM	N/S	N/S			24.0	2,245				
PM-10	24.0	8,760		8,760	Based on:	Based on:	8.72	0.45		10.40
CO	N/S	N/S		8,760	None	SO_2	21.06	1.08		18.18
CO a			1.0				---	---	52.65	
CO b			8.0		Limited to 99.0 T/yr.		---	---	36.86	
NO_x	N/S	8,760		5,867			---	2.25		37.88
SO_2	24.0	8,760		2,245			114.66	5.88		99.00
SO_2 c			3.0				---	---	257.99	

MODELING ANALYSIS CALCULATIONS FOR NONATTAINMENT AREAS

	Allowable Impacts						Permitted Impacts			
	NAAQS			< 100 TPY			NAAQS			< 100 TPY
Pollutant	Hours of Operation [=] hr/day	Hours of Operation [=] hr/year	Other a,b,c	Hours of Operation [=] hr/year	Hours of Operation [=] hr/day	Hours of Operation [=] hr/year	Calculated 24-hr Impact [=] µg/m3	Calculated Annual Impact [=] µg/m3	Other a,b,c	Calculated Emissions [=] ton/year
PM	N/S	N/S			13.8	2,245				
PM-10	13.8	5,024		8,760	Based on:	Based on:	5.00	0.45		10.40
CO	N/S	N/S		8,760	PM-10	SO_2	12.08	1.08		18.18
CO a			1.0				---	---	52.65	
CO b			8.0		Limited to 99.0 T/yr.		---	---	36.86	
NO_x	N/S	8,760		5,867			---	2.25		37.88
SO_2	24.0	8,760		2,245			65.75	5.88		99.00
SO_2 c			3.0				---	---	257.99	

FUGITIVE EMISSION CALCULATIONS FOR ATTAINMENT AREAS

	PM	PM-10
Pre-Dryer Source Emissions ([=] lb/hr)		
Loader -> Cold Aggregate Bin	2.26	0.85
Cold Aggregate Bin -> Conveyor	2.26	0.85
Conveyor -> Drum Dryer	2.26	0.85
Total Pre-Dryer Source Emissions	6.77	2.56
Post-Dryer Source Emissions		
Screening Process	NA	NA
Screen -> Hot Bins	NA	NA
Hot Bins -> Weigh Hopper	NA	NA
Weigh Hopper -> Pug Mill	NA	NA
Total Post-Dryer Source Emissions	NA	NA
Scavenger Control Efficiency	NA	NA
Total Uncontrolled Emissions ([=] lb/hr)	6.77	2.56
Total Uncontrolled Emissions ([=] T/yr)	7.60	2.87
Total Controlled Emissions ([=] lb/hr)	6.77	2.56
Total Controlled Emissions ([=] T/yr)	7.60	2.87

FUGITIVE EMISSION CALCULATIONS FOR NONATTAINMENT AREAS

	PM	PM-10
Pre-Dryer Source Emissions ([=] lb/hr)		
Loader -> Cold Aggregate Bin	2.26	0.85
Cold Aggregate Bin -> Conveyor	2.26	0.85
Conveyor -> Drum Dryer	2.26	0.85
Total Pre-Dryer Source Emissions	6.77	2.56
Post-Dryer Source Emissions2		
Screening Process	NA	NA
Screen -> Hot Bins	NA	NA
Hot Bins -> Weigh Hopper	NA	NA
Weigh Hopper -> Pug Mill	NA	NA
Total Post-Dryer Source Emissions	NA	NA
Scavenger Control Efficiency	NA	NA
Total Uncontrolled Emissions ([=] lb/hr)	6.77	2.56
Total Uncontrolled Emissions ([=] T/yr)	7.60	2.87
Total Controlled Emissions ([=] lb/hr)	6.77	2.56
Total Controlled Emissions ([=] T/yr)	7.60	2.87

Source: National Asphalt Pavement Association
a CO 1-hr Averaging Period
b CO 8-hr Averaging Period
c SO2 3-hr Averaging Period

SPREADSHEET SUMMARY - results of emission and modeling calcs for all pollutants

ATTAINMENT & UNCLASSIFIABLE AREAS			NONATTAINMENT AREAS	
Uncontrolled	Controlled	Dryer	Uncontrolled	Controlled
9596.9 T/yr	7.5 T/yr	PM	9596.9 T/yr	7.5 T/yr
2171.9 T/yr	7.5 T/yr	PM-10	2171.9 T/yr	7.5 T/yr
18.2 T/yr	18.2 T/yr	CO	18.2 T/yr	18.2 T/yr
37.9 T/yr	37.9 T/yr	NOx	37.9 T/yr	37.9 T/yr
99.0 T/yr	99.0 T/yr	SO_2	99.0 T/yr	99.0 T/yr
		Generator		
0.0 T/yr	0.0 T/yr	PM	0.0 T/yr	0.0 T/yr
0.0 T/yr	0.0 T/yr	PM-10	0.0 T/yr	0.0 T/yr
0.0 T/yr	0.0 T/yr	CO	0.0 T/yr	0.0 T/yr
0.0 T/yr	0.0 T/yr	NOx	0.0 T/yr	0.0 T/yr
0.0 T/yr	0.0 T/yr	SO_2	0.0 T/yr	0.0 T/yr
		Fugitives		
7.6 T/yr	7.6 T/yr	PM	7.6 T/yr	7.6 T/yr
2.9 T/yr	2.9 T/yr	PM-10	2.9 T/yr	2.9 T/yr
		Total [1]		
9604.5 T/yr	15.1 T/yr	PM	9604.5 T/yr	15.1 T/yr
2174.8 T/yr	10.4 T/yr	PM-10	2174.8 T/yr	10.4 T/yr
18.2 T/yr	18.2 T/yr	CO	18.2 T/yr	18.2 T/yr
37.9 T/yr	37.9 T/yr	NOx	37.9 T/yr	37.9 T/yr
99.0 T/yr	99.0 T/yr	SO_2	99.0 T/yr	99.0 T/yr
2174.8 [=] T/yr of PM-10	99.0 [=] T/yr of SO_2	Title V PTE Summary [2]	2174.8 [=] T/yr of PM-10	99.0 [=] T/yr of SO_2
9604.5 [=] T/yr of PM	99.0 [=] T/yr of SO_2	Facility PTE Summary	9604.5 [=] T/yr of PM	99.0 [=] T/yr of SO_2
Enforceable Limits -- Attainment Areas			Enforceable Limits -- Non-Attainment Areas	
24.0 hr/day	2,245 hr/yr		13.8 hr/day	2,245 hr/yr
Dryer Controlled Emission Rates		Emission Limits	Dryer Controlled Emission Rates	
6.7 lb/hr	7.5 T/yr	PM/PM-10	6.7 lb/hr	7.5 T/yr
16.2 lb/hr	18.2 T/yr	CO	16.2 lb/hr	18.2 T/yr
33.8 lb/hr	37.9 T/yr	NOx	33.8 lb/hr	37.9 T/yr
88.2 lb/hr	99.0 T/yr	SO_2	88.2 lb/hr	99.0 T/yr
Generator Controlled Emission Rates		Emission Limits	Generator Controlled Emission Rates	
0.0 lb/hr	0.0 T/yr	PM-10	0.0 lb/hr	0.0 T/yr
0.0 lb/hr	0.0 T/yr	CO	0.0 lb/hr	0.0 T/yr
0.0 lb/hr	0.0 T/yr	NOx	0.0 lb/hr	0.0 T/yr
0.0 lb/hr	0.0 T/yr	SO_2	0.0 lb/hr	0.0 T/yr

[1] Total is the dryer, generator and fugitives added together for total PTE.
[2] Title V PTE summary does not account for PM, only PM-10.

APPENDIX B

July 27, 1998

MEMORANDUM

TO: Robert Wilkosz, Bureau Chief, Technical Services Bureau (TSB)

FROM: Krishna Viswanathan, Air Quality Engineer, TSB

THRU: Matt Stoll, Sciences Manager, TSB

SUBJECT: Control technology (CT) analysis for Bannock Paving Company

Summary:
The qualitative CT analysis for Bannock Paving Inc. confirms that the controls enforced by the currently proposed Tier II operating permit meet Best Available Control Technology (BACT) classification for some sources and RACT for some other sources. This level of control adequately provides for compliance with all applicable air standards even when sources are collocated in a nonattainment area (most conservative case), as evidenced by the permit analysis. It should be noted that this memorandum does not constitute a comprehensive control technology assessment for Bannock Paving Inc. This qualitative analysis was performed based on USEPA guidance for BACT and RACT determinations, and the Rules for Control of Air Pollution In Idaho (Rules).

Analysis:

Asphalt Plant: The proposed Tier II operating permit limits the PM emissions from the hot-mix asphalt dryer stack to a grain loading standard of 0.04 grains/dry standard cubic foot (gr/dscf). This is comparable to the most stringent standards listed for Asphalt Plants in the RACT guideline document. The handling and process PM emissions are also subject to the same standard of 0.04 gr/dscf. The exhaust from the dryer stack is vented through a baghouse with a rated control efficiency of 99%, and is considered BACT for such sources by EPA's RACT/BACT/LAER Clearinghouse (RBLC). Open area fugitive emissions (roads, piles) are controlled using reasonable control options as specified in the rules (IDAPA 16.01.01.651).

In addition, there is requirement of zero visible emissions at the property boundary. This limitation is also consistent with the most stringent standards described in the RACT guideline. Therefore, most of the emissions from the Asphalt Plant are controlled using technology considered to be BACT, and all sources are controlled using RACT.

Rock Crusher: The Tier II operating permit restricts opacity from the crusher to 15%, and transfer point opacity to 10%, determined using methods specified in the "Procedures Manual for Air Pollution Control" for the state of Idaho. Conveyors and transfer points will be controlled by application of water when necessary. Open area fugitive emissions (roads, piles) are controlled using reasonable control options as specified in the rules (IDAPA 16.01.01.651).

General: In the permit analysis there are emission limits specified for the worst case operations scenario, when two pieces of equipment (crusher and asphalt plant) are collocated in a nonattainment area. The analysis is performed using a screen model with pertinent assumptions about fugitive emissions. This conservative case does not violate the NAAQS due to controls specified and also because the limited hours of operation, on the short term basis. The application of reasonable control per the rules adequately controls emissions from roads, storage piles, and associated activities.

Conclusion: Conservative analysis by modeling and literature search indicates the Tier II operating permit proposed for issuance to Bannock Paving Company provides for an adequate level of control consistent with the need to meet the national ambient air quality standard (NAAQS) in a nonattainment area.

CC: Bannock Paving - Source File
Yihong Chen
COF

APPENDIX C

07/08/98
10:58:13

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Bannock Paving - Crusher #1, with 7/8/98's infor from facility

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = .126000
STACK HEIGHT (M) = 4.1148
STK INSIDE DIAM (M) = .1524
STK EXIT VELOCITY (M/S)= 159.6316
STK GAS EXIT TEMP (K) = 827.6000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 1.5240
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = .0000
MIN HORIZ BLDG DIM (M) = .0000
MAX HORIZ BLDG DIM (M) = .0000

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 6170.0000 (ACFM)

BUOY. FLUX = 5.871 M**4/S**3; MOM. FLUX = 52.384 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	.0000	1	1.0	1.0	320.0	84.93	3.19	3.17	NO
100.	12.81	4	20.0	20.0	6400.0	8.16	8.25	4.74	NO
200.	11.25	4	10.0	10.0	3200.0	12.20	15.73	8.81	NO
300.	9.222	4	8.0	8.0	2560.0	14.22	22.79	12.43	NO
400.	7.540	4	5.0	5.0	1600.0	20.28	29.81	15.95	NO
500.	6.552	4	5.0	5.0	1600.0	20.28	36.44	18.87	NO
600.	5.742	4	4.0	4.0	1280.0	24.32	43.11	21.98	NO
700.	5.108	4	3.5	3.5	1120.0	27.20	49.63	24.92	NO
800.	4.598	4	3.0	3.0	960.0	31.05	56.10	27.87	NO
900.	4.186	4	3.0	3.0	960.0	31.05	62.36	30.45	NO
1000.	3.854	4	2.5	2.5	800.0	36.44	68.75	33.40	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

114.	13.13	4	20.0	20.0	6400.0	8.16	9.38	5.34	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED

DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	13.13	114.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

07/07/98
15:15:44

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Bannock Paving Cedarapids #1 Tier II OP 777-00140

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	.126000
STACK HEIGHT (M)	=	11.8800
STK INSIDE DIAM (M)	=	1.5750
STK EXIT VELOCITY (M/S)	=	8.0895
STK GAS EXIT TEMP (K)	=	400.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 33395.000 (ACFM)

BUOY. FLUX = 13.160 M**4/S**3; MOM. FLUX = 29.727 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	.0000	1	1.0	1.0	320.0	158.14	2.17	2.14	NO
100.	.3692	3	10.0	10.2	3200.0	24.21	12.67	7.78	NO
200.	2.952	4	20.0	20.5	6400.0	15.61	15.67	8.69	NO
300.	3.137	4	20.0	20.5	6400.0	15.61	22.70	12.27	NO
400.	2.809	4	15.0	15.4	4800.0	18.43	29.58	15.51	NO
500.	2.520	4	10.0	10.3	3200.0	24.06	36.38	18.76	NO
600.	2.268	4	10.0	10.3	3200.0	24.06	42.92	21.61	NO
700.	2.073	4	8.0	8.2	2560.0	28.29	49.46	24.58	NO
800.	1.874	4	8.0	8.2	2560.0	28.29	55.81	27.27	NO
900.	1.689	4	5.0	5.1	1600.0	40.73	62.43	30.60	NO
1000.	1.616	4	5.0	5.1	1600.0	40.73	68.62	33.13	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

253.	3.254	4	20.0	20.5	6400.0	15.61	19.51	10.66	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED

DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3.254	253.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****